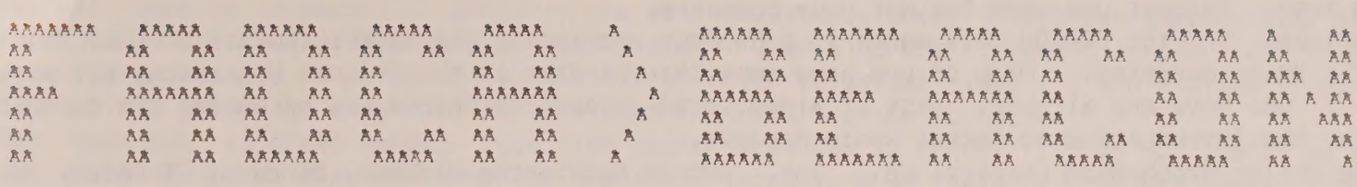

The Newsletter of THE FLORIDA AMATEUR DIGITAL COMMUNICATIONS ASSOCIATION
Vol. 1, No. 3 Brandon, FL March, 1984

NEWS AND COMMENTS

Gwyn Reedy, W1BEL
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This will be a long column this month. A lot is happening in Florida and the nation with digital communications, and there are many local items of interest. I'll also publish extracts from a number of letters received.

A personal note first. I am leaving March 28th for a temporary assignment to the Middle East. I'll be assigned to the USS LaSalle (we call it the 'love boat') but will spend much time travelling to Mid-Eastern countries. I'm Air Force, not Navy, so this is a unique asignment. My scheduled return date is August first. I am very disappointed with being away from home for such a long period of time. After several years of promoting packet radio activity, the mode is now exploding in popularity in this region, and I feel disappointed at not being here to participate during this critical time. I encourage each of you to continue to promote this form of amateur communication, and to support FADCA as the state-wide organization to coordinate packet and other digital modes. Ted Huf (K4NTA) has been instrumental is bringing FADCA to its present level of success and he will be in charge of the organization during my absence. He will also be publishing the BEACON with the help of George (WD4BRF) and Nancy (WD4BRG) Crowell, Guy Carbonneau (KA4VWW) and ALL OF YOU! Thanks Ted and crew. I would also like to recognize the contributions of time, ideas, and support to FADCA made by Bill Sams (KF4LG), Pat Shaughnessy (KF4EF), Bill Adams (KB4ZS). There have been more recent active supporters including W4AFV, K4RHD, K4HFL, K4AHO, N4APC, WD4BMN, WD4FAB, W4DNU, KE4PM, K4GFC, WD0EEL, N2WX, WD4JKM, and others. I thank all of you and everyone that has joined FADCA for helping get this organization going. Undoubtedly I have overlooked someone in the above list, and for that I apologize.

The BEACON is late this month because of my preparations for my trip. I'm sure Ted will be able to get it back on schedule. I'll be contributing to the BEACON from my overseas post. Any mail sent to my home address will be forwarded to me (or to Ted if appropriate for the BEACON). I'm taking my TNC and computer on the trip to try to develop some interesting CP/M terminal software that will enhance the TAPR board's operation.

FADCA's financial condition is good for the time being. We have enough funds on hand to publish this month's BEACON and also the April issue. Beyond that, we will need to depend on additional payment of membership dues to continue publishing. By the way my wife is maintaining the FADCA checking account while I am gone. I looked into establishing a FADCA club account but the minimum fees I could discover amounted to more than $30 per year, and we don't have that kind of money to spend. I maintain a detailed record of monies received and spent and this record is available for any member's inspection. We will have to reduce the mailing list soon in order to control expenses. The April issue (#4) will be the last one sent to persons that have not contributed to the organization. There is one major exception - complimentary copies to other organizations. I have been sending out about 25 copies each month to people and organizations around the country that are interested and involved in digital communications. I believe that expense is well worthwhile to allow others to become aware of our activities. I think we should also continue to send complimentary copies for a few months to persons that write and express an interest. What must be done now is to purge the mailing list of addresses of persons that have been receiving the BEACON from the beginning and do not feel they wish to become FADCA members. Look at your mailing label (handwritten until next month!!) for a letter after your name. M means member, C means complimentary copy supported by the FADCA membership, and nothing indicates you should forward your membership application if you wish to continue receiving the newsletter. We want to get the newsletter out to as many people as possible but have to be fair to the paid members and see that expenses are held down enough to ensure continued publication. If there has been any mistake in the records of membership payments or if you have not received all issues of the BEACON please let me know.

Larry Prelog (KE4PM) has volunteered to host the proposed FADCA picnic in the Avon Park or

Sebring area. Suggest you send Ted Huf your comments.

Included in the BEACON this month is a handout reprinting the advertisements of the four TNCs currently being marketed. Many of you have seen this handout at the Orlando Hamcation, but many have not. If you have one already, pass it along to an interested friend and encourage him to write to FADCA for the Introduction to Packet Radio handout.

The Miller-Stephenson Chemical Co., Inc., George Washington Highway, Danbury, CT 06810, markets a conductive coating aerosol (M-485) that reduces RFI by at least 21 dB at 100 mHZ and by 49 dB at 10 mHz. It appears to have great potential for allowing computers and radios to be on at the same time in the hamshack. The minimum order is 4 cans at $7.00 each, but if 12 or more cans are ordered the price is $6.25. I sure can use a couple of cans ... is someone willing to be a point of contact to consolidate an order.

The Northern Florida Section Emergency Coordinator (W4UCA) wrote the following in his January newsletter, "...Would anyone care to step forward and consult with me about the ideas we have in mind on developing state-wide 2-meter nets for Emergency Traffic Only? ...My observations cause me to believe that within the state, 2-meter RTTY traffic with several relays where necessary could be more accurate and possibly more timely, than one relay on voice through the static and QRM..." (That is very condensed but accurate extract of his article.) A FADCA member, Dick Jansson (WD4FAB), responded (in part): "Rather than perform RTTY on conventional equipment, 45 baud, 170 Hz shift, I must encourage in the strongest possible terms that you should employ Packet TNCs for the linkage. Packet radio communications really allows shared frequency usage, whereas 45 baud does not. Moreover, the packet communications is error checking and will get through much better than conventional RTTY...Every such setup can be employed as a repeater, and the list of advantages goes on and on...The employment of packet for ARES activities would be a giant step forward."

KF4LG has promised to write a glossary of packet terms and acronyms to assist BEACON readers in interpreting all the jargon. Look for it in the April issue.

The 2 meter band has had a number of good tropo openings lately and the packet frequency had some interesting activities. The kind of things we were able to do will be possible on an everyday basis very soon because of new stations coming on the air to act as digipeaters. One evening saw simultaneous packet QSOs between Brandon, Melbourne, Stuart, and Ft. Lauderdale areas. Tom, K4GFG, fired up his Kilowatt and was copied directly by KF4LG in Brandon, even though Tom's antenna was pointed due north. It was possible to check into K4NTA's bulletin board for several days running from the Tampa area. The K4NTA-1 digipeater performed yeoman service, handling 3 and 4 simultaneous connections. (In theory it can handle a much larger number.) To spot band openings, I have been sending frequent short beacons set up so that the Stuart digipeater will echo them. (Set UNPROTO: FADCA via K4NTA-1 on TAPR boards.) Noting the number of beacons I get back gives an indication of the band condition. N2WX often transmits beacons that include the time of day and a screenful of those gives an immediate feel for the amount of packets getting through. A program in the receiving end computer could use its own returned beacons, or timestamped packets, to calculate a band condition quality factor. Doing this for a few days made me realize the real value to getting packets through on a slow but continuous basis. Much as would be the case with meteor scatter, tropo scatter allows a packet to sneak through every so often. Over a period of time, quite a quantity of data can be passed. I would find it quite valuable to be able to type in a screen full of comments to a packet friend and be able to get the entire message to his computer within 4 to 8 hours. Slow but very useful. I plan to configure my hamshack computer to feed the TNC incremental portions of a message in such a fashion that short times of connectivity can be utilized.

FADCA has received a number of favorable comments and mentions in other publications. In QEX #24, "...the FADCA Beacon, a well-written newsletter..." "...Keep up the good work..." from Pete Eaton, WB9FLW. Mention in March QST p. 55 as participating in the Third ARRL Amateur Radio Computer Networking Conference. (FADCA will possibly be represented by WD0EEL, K4GFG, and KA4VWW if all goes well. Yours truly will be on the "love boat" at that time. I was also unable to make time to prepare a paper for the conference.) The New England Packet Radio Association (NEPRA) newsletter #7 contained reprints of 2 BEACON articles. By the way the NEPRA has a lot of packet activity ongoing, and some fine technical articles in the newsletter. Some will be reprinted in the BEACON, space permitting, but serious packeteers should consider joining. NEPRA, P.O. Box, Bedford, MA 01730. (Thats right, no box number is shown.)

K4RHD working with W4APV has his wirewrapped TAPR TNC on the air since early March. It works just fine. They are building two more, but parts are hard to get.

TAPR TNC kits have been received by numerous Florida stations lately. The ones I have heard about are: N4HWW in St. Pete, KK4S in Sarasota, KC4WV in the St. Pete area, KE4PM in Avon Park, N4APC in Sebring, K4AHO in Orlando, WD0EEL in Boca Raton (Jim got multiple kits and so a number of people in

his area will soon be on packet), K4GFG in the Ft. Lauderdale area. TAPR has shipped over 500 kits and expects to reach the 2000 mark by year's end. They also are offering production rights to commercial firms because it is taking such a lot of their volunteer time. I don't blame them. Just hope the quality stays the same. No telling what the retail price would be.

The question is often asked, "How much packet activity is there?" It is not useful to give a count of stations on the air, because the number is increasing so rapidly. By mid-summer there will be 50 packet stations in the state, and that is plenty for a no-nonsense network.

Dan Farnsworth, KF4WF, in Lantana, FL has obtained a copy of the AX.25 protocol and plans to do a software packet implementation on the 6809 microprocessor.

Not much feedback on the change in printsize from the first BEACON, but all of it was negative. I have stuck with the small print because there is so much information to pass along. What Ted will do next month is up to him.

The AMRAD newsletter is a super source of information on packet and many other experimental modes. The publication has been a bit tardy lately, but it is worth waiting for. ($15 to William P. Pala, WB4NFB, 5829 Parakeet Dr., Burke, VA 22015.) The October issue (only recently published) has an excellent review of the GLB packet board. One paragraph summarizes the complicated command set and the 'deafness' problem when the keyboard is in use that were mentioned in last month's review in the BEACON. "GLB admits to these problems with dumb terminals, and even suggests that this board is NOT designed to operate with dumb terminals. They point to the price of the board (least expensive on the market) and state that the real advantage of using this board comes when it is used almost as a "smart modem" to a computer. The PK1 has a mode of operation called "block mode." In this mode, the board takes a burst of data from the terminal (with a byte count at the head), and transmits the data once the byte count has been reached. When the PK1 receives a frame, it notifies the computer by sending certain characters indicating which part of the frame is coming next (data after a '' '' '', address field after a ".", control field after a "-", and PK1 status after a "#". It should be noted that the same commands as those used by a dumb terminal must also be used by the computer to make the PK1 do something, but this should be trivial once the computer is programmed to operate with the PK1 in block mode."

The NOV/DEC AMRAD newsletter contains a lengthy review of the Bill Ashby Pacnet board. I will extract a few key sentences, since space does not permit complete reprinting this month. "The Ashby board is actually a smaller, updated version of the original Vancouver board. It has been designed to be compatible software-wise with the Vancouver board...(It) is 4.5 by 6 inches. It runs on 8-10 volts and draws approximately .5 amp. This board does generate true RS-232 voltage levels...There is no modem supplied on the Ashby board. This can be either an asset or a drawback...the callsign of the station, and the terminal speed and parameters settings are burned into the TIP EPROM at assembly time..Most software for the Vancouver board will run unmodified on the Ashby board(AX.25 is avail- able)...Even though it costs slightly more, I would recommend this board to those interested in the Vancouver series boards.

The Xerox Manufacturing Outlet in Dallas has been selling used 820 single board computers for $50. The board sports a Z-80 processor, 64K of RAM, several serial and parallel ports, a floppy disk controller, and it produces 80 x 24 video. To make a complete machine, you need a video display, power supply, keyboard, and disk drives. As of March 23, they have a few of these boards left, but no accessory items. (214) 960-3367 Tues-Fri, 9-4 CST. Much ham software is available for these boards.

The past month has been super busy with many packet demonstrations. I estimate 140 people attended the packet demonstration at Orlando, and many of them showed great enthusiasm. A very good contact was made with some Jacksonville people, and we expect to hear a lot from them. At least 150 people participated in the other presentations too, so many "packet seeds" were planted.

BYTES FROM THE WRITE ONLY MEMORY

Ted Huf, K4NTA
1829 NW Pinetree Way, Stuart, FL 33494

This issue of the FADCA)BEACON will be the last one edited by FADCA's founder, Gwyn (W1BEL), until his return in August from his overseas trip. In Gwyn's absence, George (WD4BRF), Nancy (WD4BRG), and yours truly will try to pick up the editing and publishing chores. We will need everyone's help in contributing articles and news items.

FADCA as of this time has 41 paid members and a mailing list of 150. We wanted to get the newsletter to as many interested people around the state as possible, but we will soon have to cut down the mailing list to reduce the costs. If you have an interest in digital communications and enjoy reading the FADCA)BEACON, please join the cause by sending in the ten bucks. I am sure that you

have friends who share your interest in packet radio or other types of digital communication, so please tell them about FADCA.

Starting with the next issue we will include a small classified section for members. If you want to sell some of your computers, radio gear, or TTY machines, let us know.

One question that I am asked a lot about packet radio is how a digipeater works. Everyone knows how a voice repeater works; you transmit on one frequency and repeater simultaneously retransmits your voice on another frequency. With a packet digipeater, the transmitting station may set up any other station to serve as a digipeater. The only requirement is that the digipeating station must be turned on and the operator must have set a command in his terminal node controller (TNC) to allow his station to be used for digipeating (this varies by brand of TNC). The operation is on a simplex frequency. It works like this: You instruct your TNC that you want to connect to W4ABC and want to digipeat via W4XYZ. All packet frames contain the calls of the originating, destination, and digipeating stations in the header. When W4XYZ's TNC hears the frame, it checks and sees if the call W4XYZ is listed in either the digipeating or destination block. If it sees that it is the station to digipeat the frame, it stores the frame in memory until it has been completely received. When the channel is clear, it retransmits the frame. On this transmission (from the digipeater), W4ABC, the destination station TNC would store the frame in its memory. If it is error free, an acknowledgement frame would be sent back to the originating station via the same W4XYZ digipeater, and the text of the packet would be sent to W4ABC's terminal screen. This ACK frame would be picked up by the digipeater and retransmitted to the station that originated the information packet (your station). Even if the originating station can be heard directly by the destination station, the destination station will take delivery only from the digipeater because that is the way it was set up in the packet header. Digipeating through multiple stations is handled in a similar manner. The example above only set up one station to digipeat through, but the TAPR and GLB software allow for up to eight stations to be specified as digipeaters. Each station determines what it is to do with a received packet by looking at the header. That is how we can cover such great distances on 2 meters. This points up one very important operating procedure. If two stations can be heard clearly by each other, they should not use a digipeater because it will only increase the time needed to get a packet through and add to the traffic on the channel. Digipeaters should only be used to extend the range of coverage and for testing. (Editor's note: Extending range might apply for a number of purposes including allowing other stations to listen in. The principle is not to digipeat unless you have a need to so you won't tie up the frequency needlessly.)

I have heard that some people object to our use of 147.465 for packet radio. It seems that 147.480 is used by the DXers as an intercom frequency in some areas. I think that I should go into the process that I used in selecting 147.465 as the frequency for packet radio, at least for the Stuart area. The first thing I did was to contact the Florida Repeater Council and I was told that they do not coordinate simplex frequencies. The plan, back over a year ago, was to use the Perry cable TV tower as a digipeater site. This happens to be the same tower used by the Stuart 147.06 (-600) voice repeater. Because of possible interference to the CATV system's use of channel E (145.250), I felt I had to use a frequency above 147 mHz. The cable company donates the tower space and I didn't want to cause them problems. I selected a 15 KHz split frequency because I figured it would be less likely that there would be existing operation on an odd frequency. But now we have the DX club saying that we should move off 147.465 because we are interfering with their use of 147.480. Selecting a new frequency is not a simple process, and there is a strong possibility that we will only run into some other established group that does not want us on "their" frequency. One thing that will make a statewide packet radio network possible is a single statewide frequency to enable long distance digipeating operations. Please let me know your feelings.

I am going to do some experimenting to determine the actual interference potential with the CATV setup. It is possible that operation below 147 mHz will be possible if the digipeater antenna is properly sited on the tower.

PACKET COMMUNICATIONS AND HERO

Guy Carbonneau, KA4VWW
4269 SE Whiticar Way, Stuart, FL 33494

As you are aware, the packet communications concept is to allow amateur radio operators the ability to transfer digital information over great distances. Not only can data traffic be exchanged between data terminals and/or computers, but the integrity of these packets is extremely accurate. The original packet technology was developed to tie computer users over a wide area. Since most of this was done over common carrier lines, both commercially and by the government, the introduction of radio communications added a tremendous boost to the overall packet scheme, eliminating the need for

hard wires between computers or terminals.

My interest in packet communications is both in amateur radio use and robotics. Being the proud owner of "Hero", the robot from Heath company, I found a marriage between Hero and packet. Applying packet communications to Hero allows Hero to be programmed remotely from a computer.

Briefly, Hero operates with a 6808 microprocessor, permanent memory and temporary memory. The micro has a small number of built-in commands that it recognizes and the permanent memory allows it to recognize more commands that apply to robot operations. The computer is connected to a keyboard, to each of the senses, and to each of the motors. This allows it to send or receive from any one device at a time as part of its operation. Hero is programmed by entering instructions to the hexadecimal keyboard mounted on top of its head. By using a hand-held remote control teaching pendent, manually controlled motor and arm movements can be programmed into its memory. The microprocessor, properly programmed, guides Hero through complex maneuvers activating its sensors. Hero is capable of interacting with its environment. It can detect light, sound, motion and objects in its path. Hero is also equipped with a speech synthesizer.

It is my intention to install a TNC packet board within Hero, allowing communications between Hero and my Z-100 computer. Although Hero has a cassette recorder input for preprogrammed tapes, the TNC would allow programs to be sent to Hero via an RS-232 interface and a radio link. This would allow full duplex, 300/1200 baud transmissions from a local digipeater user and Hero. Software will have to be developed to simulate Hero's motor positions and sensor readings before sending the program to Hero via packet. The software should be capable of reading Hero's position and sensors in order to display his environment.

The field of robotics to include packet communications opens up many areas of interest and certainly applications for the handicapped. From remote controlled wheelchairs to automated feeding devices for paraplegics is certainly not beyond the realm of these existing technologies.

If you have an interest in applications in these fields, I would certainly be happy to hear from you and, of course, if you have questions on Hero, please feel free to contact me at any time.

PACKET VS AMTOR

Pat Shaughnessey, KF4EF
7001 Interbay Ave, 112 E Ave., Tampa, FL 33616

Packet vs AMTOR. Don't they do the same thing? This question frequently is asked at packet demonstrations. Due to their differences, they can complement each other, but a statement that one is superior to the other is not valid.

What are the differences? A better question is what are the similarities? Both: 1) are digital, 2) provide error free copy, and 3) use handshaking techniques. These similarities are where the two methods part company. These two protocols come to amateur radio via commercial systems designed for completely different purposes. AMTOR is an adaptation of a system used to deliver low data rate message traffic to ships at sea over HF. Packet evolved from a system used to transfer data at high rates from one institution to another over land lines and microwave circuits. AMTOR's data rate is 110 BPS and packet's data rate is 50 to 19,200 BPS. (Current packet gear is limited to 1200 BPS because of modem restrictions, and the FCC limits data transmission to 300 BPS below 28 mHz.)

Ah-ha! you say. Packet is the way to go - look at that speed! Well, data rate and words printed on a screen or printer are altogether different. Throughput is the name of the game. You old RTTY hackers know that on a good frequency when you multiply baud rate times ten and divide it by the unit interval code (UIC) the answer is words per minute. On the other hand, when the frequency is marginal, the received WPM can go to zero real quickly. All of the characters may be there but figuring out what they are can be impossible. The point is, with AMTOR and Packet, baud rate cannot be directly translated into WPM received.

AMTOR at 110 BPS sends three seven bit characters at a time and then waits for acknowledgement (ACK) or a no acknowledgement (NACK). On a good frequency this would be a throughput of about 60 WPM. On a RTTY circuit using 5 level code and a UIC of 7.5 and 110 bauds, the throughput would be approximately 150 WPM. Packet at the normally used rate of 1200 BPS, sends 437 character equivalents (Presenting 256 characaters of printed data) at a time and then waits for an ACK. If no ACK is received, it retransmits. On a good frequency, this equates to a throughput of approximately 300 WPM. There is that high speed again. The key words here are GOOD FREQUENCY. On a marginal frequency, AMTOR due to its short 3 character data burst is many times more immune to QRM/N and QSB. Packet with its maximum of 256 characters of user data may never get through.

What about using packet techniques and shortening the packet length to 3 characters like AMTOR? No contest here, because a 3 character packet (3 characters of data) would still be about 30 char-

acters long due to the addressing and error correction overhead. Well then, why not abandon packet and just use AMTOR? Several reasons; AMTOR cannot transmit the full ASCII character set. It is limited to the BAUDOT character set used on RTTY. That makes it unsuitable for transmitting many forms of data including computer programs. Also AMTOR cannot handle data at a high rate of speed if a clear frequency is available. It is a fixed speed mode based on fixed timing parameters built into the hardware and software. Packet systems allow the transmitted baud rate to be varied (by agreement between the operators) according to band conditions.

What are the conclusions here? 1) On a bad frequency, neither packet or AMTOR is usable. 2) on a marginal frequency, AMTOR is useable and packet is either marginal or unusable, and 3) on a clear frequency, Packet is far superior to AMTOR. In general, HF bands tend to be noisy and propagation variations cause received signal problems. VHF and above provide stable, less-noisy environments, but shorter ranges. At this time, AMTOR is most useful on HF, but much experimentation with techniques, procedures, and modes of propagation such as meteor scatter is providing more knowledge on this matter almost daily.

FT. LAUDERDALE AREA PACKET REPEATER GROUP (FLAPR) Tom Kneisel, K4GFG
1600 SW 115 Ave., Davie, FL 33325

Late in 1982, WA4FIB and I began to look around at what packet radio groups were doing, and found AX.25 being formulated by Terry Fox. We latched onto this format, and decided to do some experiments at 444.7/449.7 mHz employing a commercial digital radio. WA4FIB and I both work for Motorola, which makes a 1200 baud DPSK/FM base station for the 450 mHz band. The unit talks to portable data terminals with radios in them. One of WA4FIB's goals was to convert a portable unit for use in our ham system.

We decided to use the base station as a digipeater, requiring all communications to go through it. It was split frequency, working similarly to normal voice repeaters with 5 mHz transmitter to receiver spacing. WA4FIB took a repeater system home, interfaced it to his home computer, and began writing software to digipeat. I attached some hardware to my homebrew Zilog Z8 system, and began writing software demodulator routines for the Z8. The modulation chosen was the same DPSK, also known as Manchester coding. I used a portable FM radio with the modulation fed into the varactor modulator circuit, and the received audio removed from the discriminator.

As we began to exchange packets and continued our experiment, word spread throughout the Motorola Amateur Radio Club, and several others expressed an interest in joining us. We debated whether our experiment was suitable for becoming the local area packet system. Although our format was AX.25, our modulation was non-standard, we were using a repeater, and connections to the radio involved getting inside the box. Nonetheless, our system had potential for 4800 baud operation and inproved bit error rate performance compared to the Bell 202 (AFSK) modulation. Tests have shown about a 3.5 - 4 dB improvement in performance compared to the curves shown in QEX #10 for the TAPR boards. Why shouldn't hams experiment with new concepts and circuits we asked ourselves?

So I designed a self-contained TNC board with a Z8 microcomputer on it, and three of them were wirewrapped by local packet enthusiasts. Since this was still an experimental system with an uncertain future, one of the design goals was to keep the cost to a minimum. The boards cost about $60 to populate, excluding power supply.

We moved the repeater to the Motorola site in Plantation, Fl, and from June to December of 1983 it was on the air continuously. Activity was sparse, and sometimes a month went by without any activity. But then one of us would fire off a packet, and that repeater would digipeat it right back again!

More requests for boards came in, so we decided to lay out a pattern which would be single sided and could be made at home. That layout is currently in taping, and we should have the first boards within a month or so. About a dozen people have requested them.

Status of the TNC software is about 50% complete. The higher levels including automatic retry and user interface have not been written. The boards formulate packets according to AX.25, and the receiving routines check the CRC and perform address checking for operation in the Set Asynchronous Balanced Mode (connected mode). The wirewrapped boards appeared free of both hardware and software bugs. The repeater is currently off the air pending a new controller board by WA4FIB.

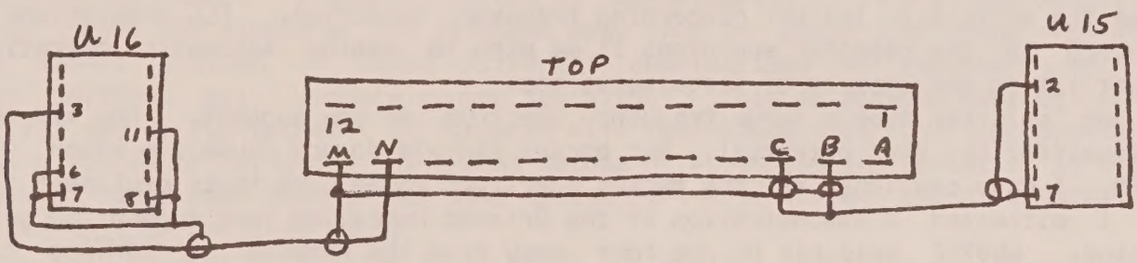
When the software is more complete, we will look at linking our system into the 2m statewide network. I think the higher baud rates and other experiments with our Manchester boards will follow. I have OSCAR capability, and am anxious to see how our software phase locked loop works for us on SSB through the satellite. I will also spread the word to locals about the 2m network, so they can decide

how best to enter the network...either through our 449 mHz system with its planned gateway to 2m, or directly on 2m with a TAPR or GLB board. A future article will detail our TNC board and its unique software modem.

OPERATING THE COMMODORE-64 AND THE TAPR TNC WITHOUT AN RS-232 ADAPTER

Jim Diggs, K4AHO 7900 Plunkett Ave., Orlando, FL 32810

This modification eliminates the need to use an RS-232 adapter for the C-64 when used with the TAPR TNC. The only warning is to try to keep the cables as short as possible. Parts required are two 14 pin headers, two pieces of shielded audio cable of the required length, and a connector for the user port of the C-64. This can be a TRW 251-12-30-160 or equivalent part. Use U15 and U16 headers to replace U15 (1488) and U16 (1489). Good luck!!



LETTERS TO FADCA

March 18, 1984

Dear Gwyn:

Thank you for the information copies of the FADCA BEACON. Your group sounds like a very energetic one. I have circulated the bulletin at the North Florida Amateur Radio Society and we plan a write-up on FADCA in our next club bulletin. I'll see that you get a copy.

Good luck to FADCA and again thanks for the information.

73, Billy Williams, N4UF, President, North Florida Amateur Radio Society, Inc.

Dear Gwyn;

I saw your letter printed in the Florida Skip. I have been involved with computers and radio for about 4 or 5 years now. We have a very active group with computers, along with RTTY and a couple of MSO's on 2 meters. There is much interest in packet....Oh! You mentioned many of the hamfests in the letter except Jacksonville. I usually try to attend this hamfest. With a beam in that direction we should be able to communicate via 2 meters. Are there any packet activity on 2 meter SSB? .....Hopefully one day our group will be one in a link from you to Atlanta !!

73's, Wayne Harrell, WD4LYV, RT1, Box 185, Sycamore, GA 31790

Wayne also wanted to get the packet videotape and those arrangements are made. Ted Huf, K4NTA and George Crowell, WD4BRF are making arrangements to present a packet demonstration at the JAX hamfest. The videotape is being shown there this month and much interest and participation is expected.

March 13, 1984

Dear Gwyn (W1BEL),

Just received your newsletter of Jan 1984. It sounds like your group has a VERY avid interest building up. Your extreme interest in your facet of the hobby reminds me of mine and so decided to write you a letter.

We have a very avid DX group in 147.480 which has been present there for in excess of 10 years. We communicate almost nightly with Melbourne, Orlando, Jacksonville.

Two-Three weeks ago one of our group (K3ARV) noted some interference to our frequency and advised me that soon I would hear the same thing in Orlando. Unfortunately he was right and I too now hear frequent bursts of interference from your digi repeaters.

I understand that we all have use of any frequency we desire but it sure would be nice if these

VERY LOUD transmitter frequencies could be changed to a simplex frequency that was not adjacent to a state wide net.

Why do these things splatter over such a large frequency spectrum??

It sounds like this digi repeater stuff is going to be very popular and our minority group of DXers will be driven off 147.480 but this is to let you know we do exist and there is interference.

73, Dr. Austin Regal, 1425 Foxfire Dr., Apopka, FL 32703

Public Reply to Dr. Regal:

Dear Sir,

I appreciate your letter and the straightforward manner in which you approached the interference problem. We have no desire to cause interference and will work to eliminate it if it is possible to do so. We are actively searching for another frequency that is suitable, but finding one that fits all the requirements is not easy. No doubt someone near any other frequency would be inconvenienced also. Please see the article by Ted Huf concerning frequency selection. FCC regulations require us to use a frequency in the repeater sub-bands if we wish to employ automatic operation of our digipeater, so that limits our choices of frequencies too.

Packet does not "splatter over a large frequency spectrum" as you suggest. Any improperly tuned or operated transmitter has that potential, but packet signals do not cause any wider signal than voice modulated FM. I have cautioned all the packet operators to be sure their equipment is in proper working order. I witnessed a demonstration at the Orlando Hamcation that showed the purity of a packet transmission. WD4BRF held his HT one foot away from the antenna of K4NTA's transmitting antenna during packet transmissions. The HT was tuned to 147.480 and the packet transmitter was sending on 147.465. Not a peep was heard from the HT even with the squelch open! Not everyone's equipment is of such good quality and older gear cannot work well with 15 KHz channel spacing. That is the problem, not packet transmissions being too wide.

Your friend, K3ARV, has been quite outspoken about the interference and has suggested that much inconvenience would be caused to packet operations if we don't get off 147.465. I therefore am very pleased to get your reasonably worded letter and we will do what we can to move to a new frequency. We would like some time to select a proper frequency and be sure we are not moving in "on" someone. Please be patient. In the meantime I encourage each of you to consider whether your receiving equipment is fully adequate for operation under crowded band conditions. Even some of the newest gear is very succeptible to front end overloading and intermodulation problems.

I quote from a letter written by K4AHO to K3ARV, "..Another alternative (to confrontation) would be for the DX alert system to adopt some sort of protected squelch system, such as a tone system...The best possible solution is for the DX alert system and packet radio systems to join forces. Packet radio could offer some tremendous advantages to a DX alert system. From my experience DXing requires many hours of searching the DX bands wearing earphones. This is not conducive to hearing a DX alert on 2 meters. Usually you notice that the signal lights are lit and remove your earphones to hear the very end of the alert transmission. Perhaps you did hear the alert but did not understand the details because the alerting operator was too excited and did not repeat the transmission. Packet radio could offer a readout of the information on a monitor screen and could be printed or stored in a buffer for later reading. You would never miss an alert, since each alert could be preceeded by a bell signal. The alert could be sent all over the state in a matter of seconds. The system could be used for idle chatter (on the keys) without interfering with the alert system. The monitor function of the packet board could be set to print only those stations which are of interest to your activities."

73, Gwyn Reedy, W1BEL, for the Florida Amateur Digital Communications Association

From the NEPRA PacketEar, Newsletter of the New England Packet Radio Association:

"....Some of the thrusts that NEPRA and/or NEPRA members are presently pursueing...Network and inter-network design; High-speed RF modems; HF packet activities; Bulletin board systems; Packet-to-Amtor links; Protocol development; Portable packet pocket pager; Traffic handling; Official bulletin stations; Public service work. We are standing at the introduction of a new technology in ham radio that will certainly create changes, if not revolutions...If the rest of us stand back and let the others do all the work, we will all be the losers...Please think carefully about what you can contribute to the hobby we all seem to enjoy so much...

Notes from the February 19, 1984 ARRL/NEPRA Meeting (condensed)

...they are on the air with the League's Vancouver TNC on 145.01 mHz...W4RI's HF packet-adaptive modem (PAM) is currently in the board stuffing stage, and he is looking for interested groups who want to test this mode...W4RI then explained his ideas on the future of packet. He is primarily interested in: 1) HF packet using adaptive modems, 2) 6 meter 9600 b/s METSCAT experiments, 3) 56 Kb/s 220 mHz backbone linking systems, and 4) the growth of packet into a world-wide network by the end of the decade. The latter desire includes all of the current 2 meter work, of course.

DEVIATION ADJUSTMENT FOR PACKET OPERATION Gary Field, WA1GRC

Newcomers to packet radio may not realize the importance of proper deviation adjustment, however under deviation will result in poor noise tolerance, and over deviation will result in high error rate and inter-channel splatter. Proper deviation is approximately +/- 4 KHz peak deviation, this keeps the sidebands toward the middle of the passband away from the phase-distorting rolloff frequencies. Since every packet station is using different combinations of equipment no "fixed" set of potentiometer settings will produce proper deviation. This adjustment must be performed when a station is first set up for packet, it normally will not change much with time providing none of the equipment is replaced or serviced. The best method of adjusting the deviation is to use a deviation meter, however, since most hams do not have access to one of these, and alternate, less precise but adequate method will be outlined here.

The only test equipment required is an extra FM receiver operating on the same frequency as the packet transmitter and your ears. This receiver should have IF filters no wider than 15 KHz. Filters wider than this will result in overdeviation when you use the following technique.

1. Connect the tone output from the TNC to the radio, connect a 50 ohm dummy load to the transmitter output, and turn the radio on.

2. Turn the tone output from the TNC all the way down.

3. Turn on the extra receiver and set to the same frequency as the packet rig. It is generally best not to connect an antenna to this receiver.

4. Slowly increase the audio output level from the TNC. The tone in the extra receiver should get louder and louder until no further increase in output is noticed. STOP when this point is reached.

5. Decrease the output from the TNC until a DEFINITE decrease in volume is noted (about 3 to 4 dB). Set the output of the TNC slightly below this level.

Let me explain why this method works. When the audio level into an FM radio is increased, a corresponding increase in RF bandwidth is caused. What we have done is use a receiver with a known IF bandwidth to tell us when the RF bandwidth is equal to the IF bandwidth. This happens because when we start deviating past the edges of the IF filter, no further increase in volume will result, the signal will only get more distorted. If your signal sounds louder or softer than most of the others on the channel you should suspect that your deviation is not optimum even if your packet station seems to work fairly well. Do not use distant noisy signals for this comparison, but most others should sound about the same. After a while you will be able to recognize packet signals which are not properly adjusted for deviation and also tone calibration. Tone calibration is not a problem with the TAPR TNC since a very nice software calibration function is included in the onboard PROM, however other TNCs must be calibrated using a frequency counter. The two tones must typically be set to within 20 Hz if good performance is to be expected.

PROPOSAL TO PROVIDE AN AMATEUR DIGITAL NETWORK FOR THE GREATER NEW ENGLAND AREA (condensed)

...As a first step,... groups of digipeaters must be installed at sites which provide large-scale coverage...The next steps must include providing a mechanism which will allow linkages between the groups expected to be most active...A local digipeater would be placed in service...in a low power mode...(to) reduce potential interference...and limit the number of 2 meter stations using direct access instead of linking through regional nodes. Remote sites could access ;this digipeater through the use of gain antennas, however. A second digipeater would operate on 220 mHz at higher power, with a goal of allowing a number of links (to other areas.) ...Figure 1 shows the logical connections of one of the link sites. The primary control element is the dual-ported link management unit. The link box is a very simple microprocessor-controlled network link, with connections to provide terminal emulation to one or two TNCs. This box is designed to provide the following functions:

* automatic bootstrap of both TNCs on power up (especially important following a power failure at

a remote site)

* automatic configuring of each TNC for the type of operation required by users, typically digipeat, remote link or maintainence modes

* remote link control user interface to stations coming in on any of the link radios

* special control sequence generation to allow the TNCs to provide network level protocols without reprogramming of the TNCs (good for proof-of-concept experiments while TNCs are being reprogrammed)

* network protocol implementation...multiple virtual circuits may be provided on inter-site links, again without reprogramming the TNCs

Figure 2 details the construction of the dual-ported link management unit. Note that the design is quite simple and should prove easy to implement. RS-232 connections are required to handle the TNCs, and may be routed instead to other devices that may interface via RS-232 ports, including computers, AMTOR, ASCII, RTTY, and CW stations. Switching of HDLC and modem inputs and outputs is available for two purposes; local loopback testing of the two TNCs would be available, and they may be connected together (off the air) to provide special link connections between the TNCs which might be required for some experiments. The 16K of PROM and 8K of RAM provide a minimal facility for software developed in a higher-level language ("C").

...A user interested in linking remotely with another station would call the local link controller via one of the link radios. The link management unit would accept link requests, translate those requests into a series of packets to other stations involved in the connection, then disconnest with the originating user after creating the requested connection. The link box would then emulate the remote station whenever traffic for that station had to be handled.

The link management unit would be required to keep a directory of all connections currently in progress across any of the links, with entries for each end-to-end station pair, the route currently in use and link-level state information to allow multiplexing virtual links across a common physical link.

The NEPRA Remote Link Network (RLN) protocol may provide the first transparent internode routing multihop service. Initial experiments could use simple multi-hop digipeating (with dual TNCs connecting directly to each other via the link box's audio switching), with gradual implementation of the more efficient RLN protocol as the system develops.

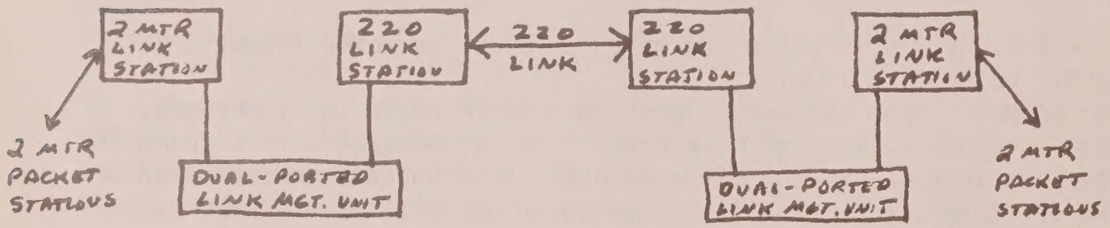


FIG 1

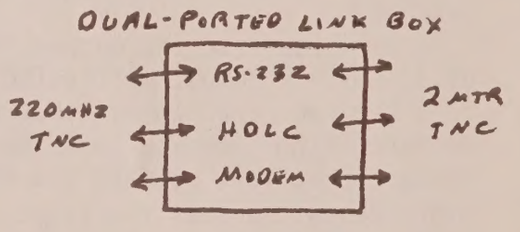


FIG 2

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